Quest Diagnostics

“In Quest of ELR”

PHIN 2004

May 26, 2004

Quest Diagnostics

Quest Diagnostics Overview

- Nation's leading provider of diagnostic testing, information and services
- Broadest menu of diagnostic tests including cardiovascular, cancer, infectious disease and anatomic pathology
- More than 85 new tests introduced each year
- Leading provider of esoteric testing, including gene-based medical testing
- Serve more than one-half of U.S. physicians and hospitals
- Six Sigma initiative
  - The Goal: Virtual Perfection (<3.4 defects per million opportunities)

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Industry Overview

- **Test results affect >70% of health care decisions, but represent only ~3% of health care spending**
- **Test results help physicians to diagnose disease, select treatment and monitor treatment effectiveness**

"Virtually nothing happens in healthcare without a lab test result"

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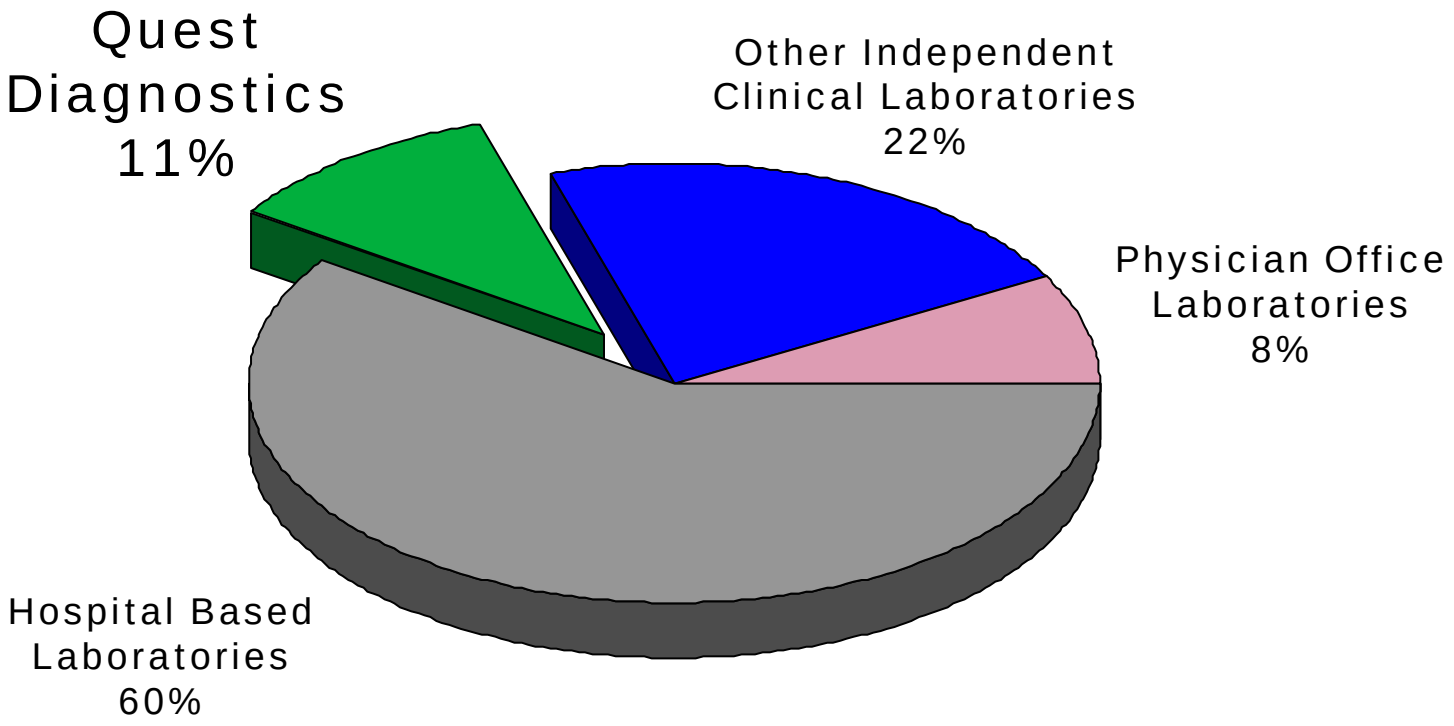
Diagnostic Testing Market

Quest Diagnostics is the Industry Leader



Our Reach

- **32 Major Regional Laboratories**
- **2 Esoteric Testing Centers**
- **150 Rapid Response Laboratories**
- **>1,700 Patient Service Centers (PSCs)**
- **Serve over 90 million lives covered by managed care organizations and third-party insurers**

115 Million Patient Encounters Annually

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Electronic Public Health Reporting

Goals and Status

- **Collaborative effort to implement a single, standard HL7 format as specified by the CDC**
  - **Collaboration between CDC, local, state, county or municipal agencies as needed during an implementation project**
    - **Texas, Georgia, Louisiana, Tennessee, Washington, Oregon, Pennsylvania, New York**
  - **Rapid implementation of standard interfaces and encryption, e.g., PHIN-MS (PHIN-Messaging System)**
    - **New York (pilot project)**

Public Health Reporting Challenges

- Conflicting priorities for both states and labs
- Private sector ability to obtain required information
  - Physicians do not provide required information to laboratories
    - Difficult for labs to obtain from physicians
  - Excessive burden on labs
  - Incomplete data slows down reporting process and ability for health agency to respond (potentially affecting public health)
- Lack of standard format for different Divisions within same State
  - Some are not the HL7 format specified by CDC

Public Health Reporting Challenges, Cont.

- **Divergent Reporting Criteria: Challenges**
  - **Customized definitions and criteria**
    - **Today: State + County + Division (e.g., AIDS)**
    - **Future: State to County to Division**
  - **Why different criteria if no geographical difference?**
    - **Is there an impact on public health?**
  - **How to begin standardizing criteria?**
    - **Common reporting requirements**

Public Health Reporting Challenges, Cont.

- **Requirements – variable data elements & standards:**
  - **Demographic data**
  - **Identifiers**
  - **Conditions**
  - **Tests**
  - **Values**
  - **Format**
  - **Coding**
  - **Transmission (e.g., paper, disk, dial in, electronic or Web)**
  - **Requirements for calling results (e.g., 24 or 48 hours)**
  - **Security and Confidentiality (encryption packages differ by state)**

Public Health Reporting Challenges

- **CODE SETS**
  - **LOINC Codes**
  - **SNOMED Codes**
    - **Ensure that interpretations are consistent**
- **WISH LIST**
  - **Laboratories report to "one" agency for local, state or division - currently reporting to many sites, need for integration**
    - **Single agency to report to local agencies**
  - **Standard (Common) Reporting Criteria**
  - **Local agency to accept incomplete information**
    - **Local agency to obtain missing information from physician**

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Electronic Public Health Reporting Committee

- Virginia Sturmfels – Corporate Manager
- Elaine Maddix – Public Health Systems Specialist (Atlanta)
- Tom Rohrs – IT Senior Programmer Analyst
- Katherine Robinson – CDC Epidemiologist
- Victor Nwadiogbu – PHIN Messaging
- Mary Hamilton – PHIN Messaging
- Margaret Marshburn – PHIN Messaging
- And other Quest Diagnostics specialists and State representation as needed

Anomaly Detection

- **Traditional Surveillance**
  - Based primarily on confirmed occurrences of known conditions
  - Variability in conditions reported in different jurisdictions
- **Syndromic Surveillance**
  - Based on recognizing patterns of behavior consistent with symptoms typical of a condition of public health concern
- **Anomaly Detection**
  - Large scale application of signal detection, pattern analysis and signal resolution to identify patterns of concern to public health:
    - Bio-terrorism
    - Emerging Infectious disease
    - Environmental effects
    - Significant changes in chronic disease patterns

AT&T / Quest Diagnostics Team

AT&T Government Solutions

AT&T Labs-Research

Quest Diagnostics Incorporated

AT&T / Quest Diagnostics
Public Health Surveillance System

- **Mission Statement**

  To deploy a scalable local / national surveillance infrastructure
  - **for timely identification of health-related anomalies,**
  - **for rapid and effective management and dissemination of alerts,**
  - **to support investigation of anomaly causes and trends, and**
  - **for integration of health data via web services.**

- **Key Challenges**
  - **Large scale data collection and warehousing**
  - **Configurable anomaly detection and efficient case investigation**
    - **Real-time alerts**
    - **Minimize false positives**
    - **Alert notification management**
  - **Extensible architecture with all threat types**
  - **System security, accessibility, reliability and availability**

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Quest Diagnostics Advantages

- **The World's Largest Private Database of Clinical Test Results**
  - **Personal health testing on >100 million patient encounters annually**
  - **>250 million diagnostic laboratory tests annually**
  - **>6.5 million gene-based tests annually**
  - **7-8 Million individual laboratory result values daily**
  - **Tests ordered by >300,000 individual physicians annually**
  - **National coverage; Representative of US population distribution**
- **History of Collaboration and Innovation in Public Health**
  - **Prototype Syndromic Surveillance investigation of West Nile Encephalitis and Legionella, 2000; Joint presentation with CDC at ICEID, 2000**
  - **MRSA prevalence project, 2003**
  - **Possible Legionella outbreak investigation, 2003**
  - **JAMIA publication on Syndromic Surveillance, 2004**
  - **HCV Awareness Campaign assessment, 2004**
  - **Initiated Syndromic Surveillance pilot with NYC DOHMH, 2004**

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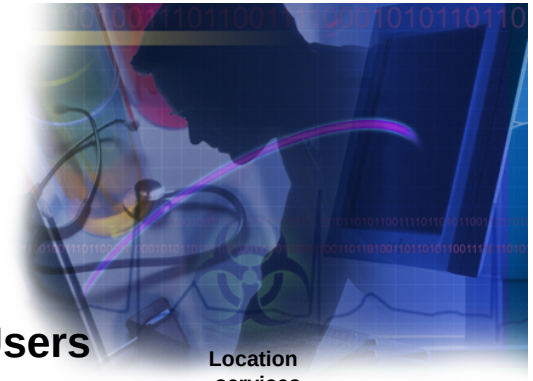
Quest Diagnostics Advantages

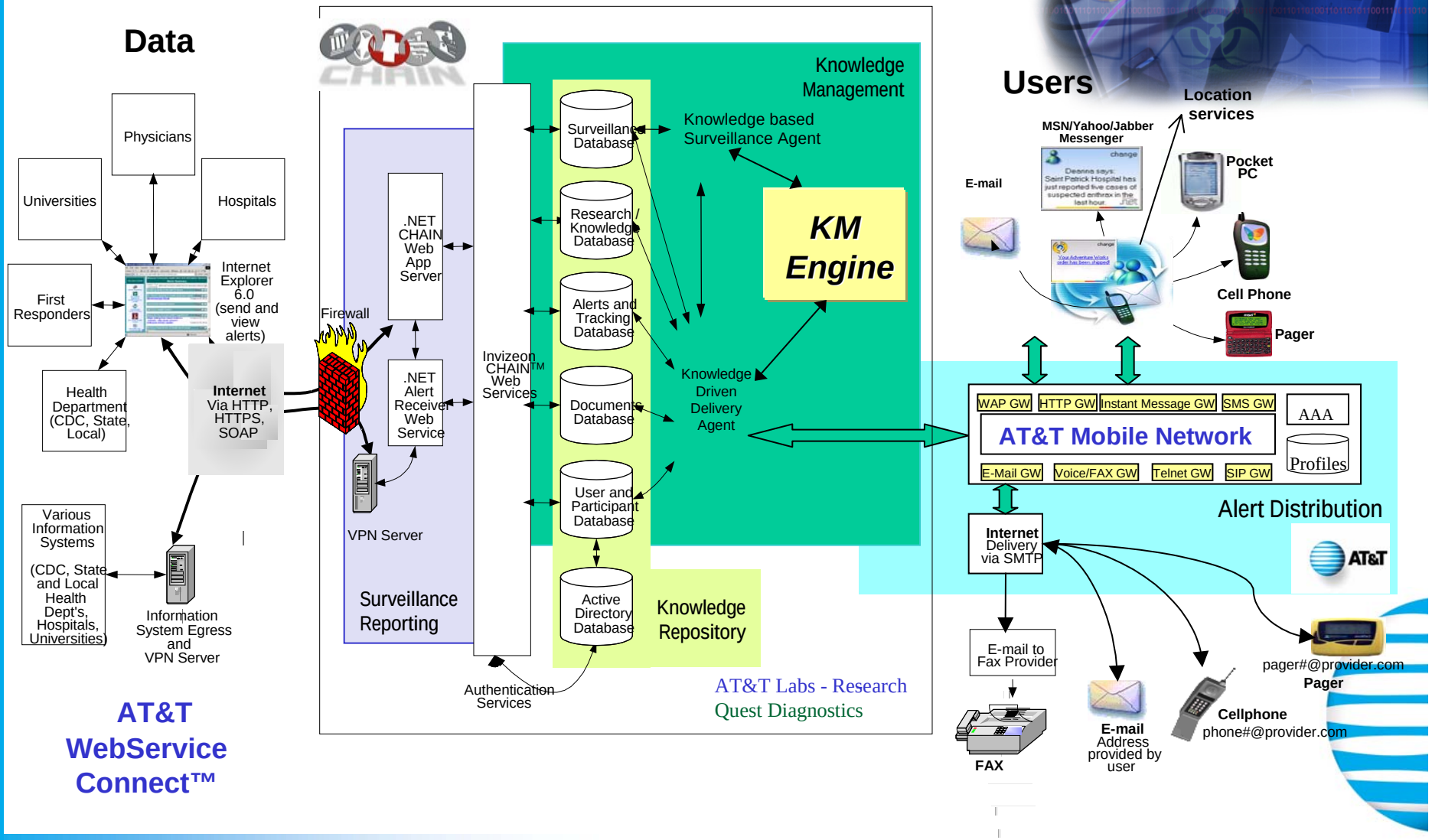
- Access to data not generally available via existing surveillance streams
- Data available in aggregated form
- Data properly de-identified for HIPAA compliance
- Deep visibility of out-patient/physician office testing segment
- Availability of data at county, state, and national levels
- Single source electronic reporting of national surveillance data for:
  - Bio-terrorism and emerging infectious disease detection
  - Enhanced surveillance for other issues of public health concern
  - Investigation of cross-jurisdictional anomalies/outbreaks
- Availability of denominator data
- Large normative data pool for routine tests

The AT&T/Quest Diagnostics Team
AT&T Advantages

- **World leader in Very Large Database (VLDB) Management Technology**
  - AT&T's **Daytona™** Data Management easily handles multi-terabyte databases.
  - Supports fast, efficient storage and complex analytics on high-volume data.
  - Won top awards in 2003 Winter Corporation TopTen VLDB Survey
- **Real-Time Data Mining and Anomaly Detection Techniques**
  - Various anomaly detection techniques that have been applied reliably in fraud detection.
  - **Signature**, continuously-updated historical profile for real-time anomaly detection
  - **Hancock**, VLS matching data streams to pattern templates using domain-specific languages
  - **Community of Interest (COI)**, encodes the graph of relationships among elements (500M keys, 63B comparisons per day).
- **Efficient Case Management, Visualization, and Notification**
  - Rule-based driven case management tool to identify cases and support work-centers and associates
  - **VMDS** (Visualization of Massive Data Sets) - Dynamic, comprehensive boundary files, multiple variables and graph types with drill down and pixelmap overlap to support real-time analysis and investigation.
  - **YOIX™**, a development environment for distributed applications.
  - **CHAIN™-EMN℠** for Alert/Notification Management
- **System Security, Accessibility, Reliability and Availability**
  - Comprehensive portfolio of network-centric services
  - 21 State-of-the-art Internet Data Centers worldwide, with 2 million square feet of hosting space
  - Over 3,500 Terabytes of data transported per day

AT&T Public Health Surveillance System Solution Overview





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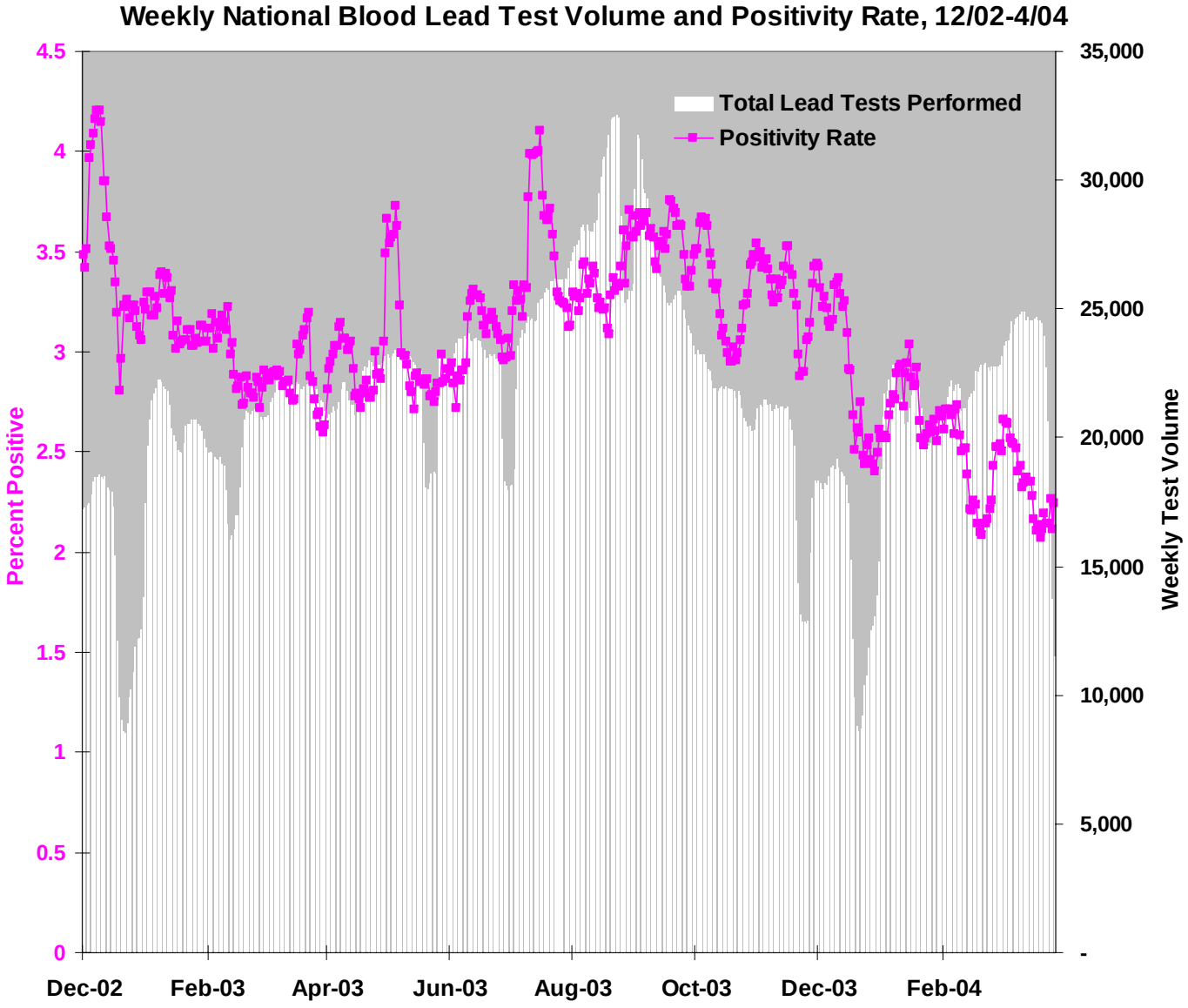
Data Analysis – Trends in Blood Lead Testing



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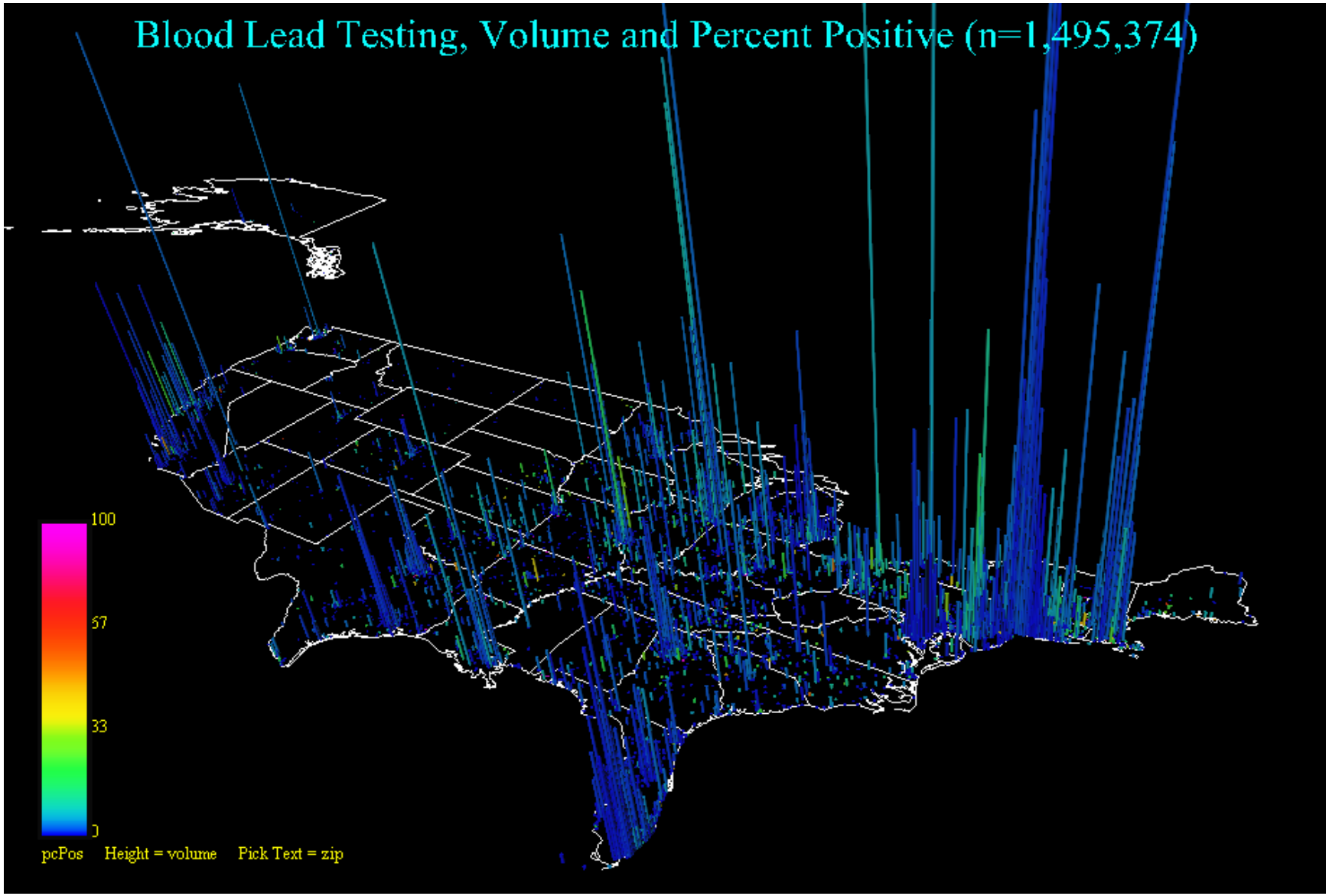
Data Visualization - National Coverage



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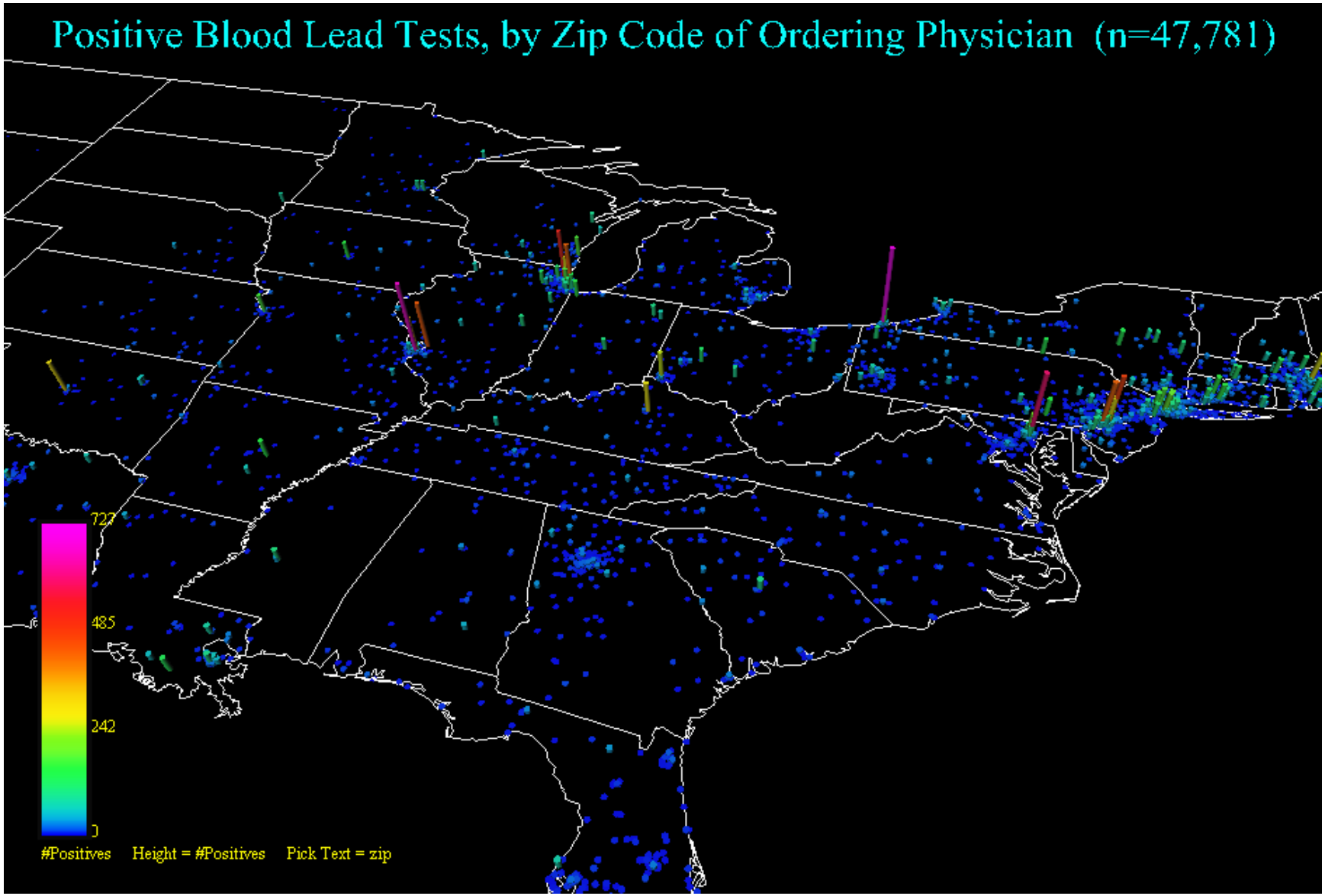
Data Visualization – Positive Tests Only



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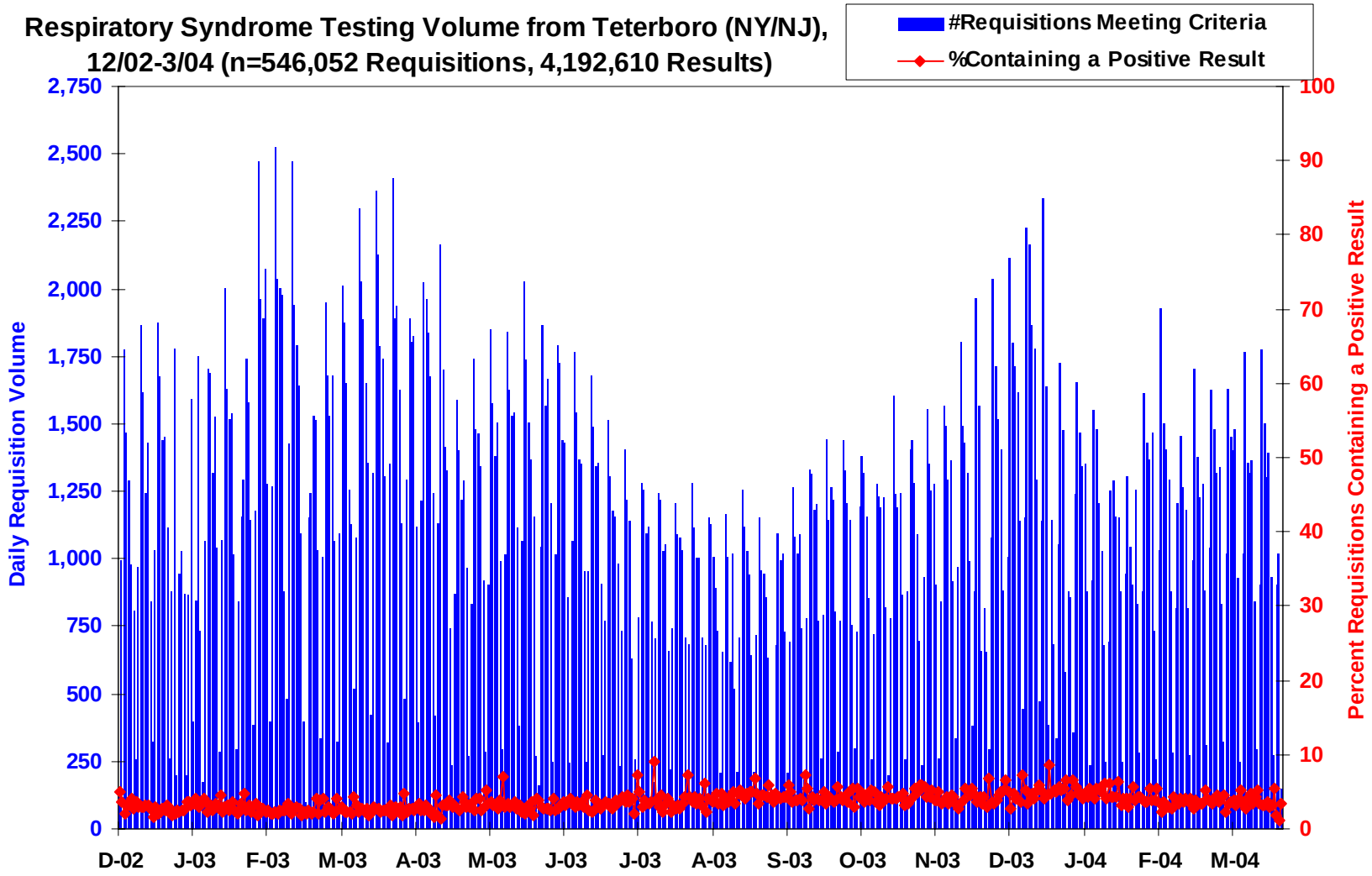
Syndromic Surveillance – Respiratory Disease



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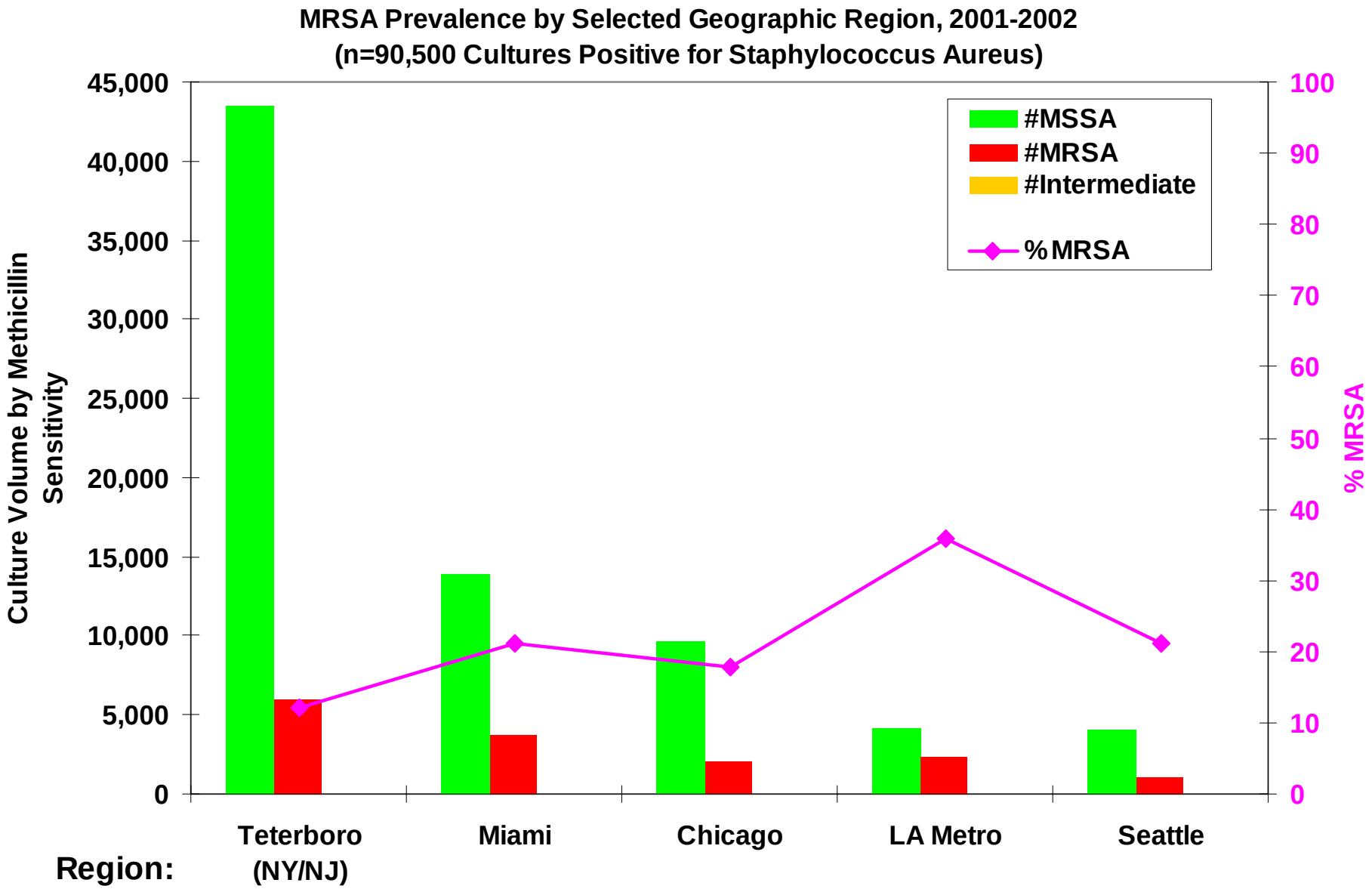
Data Analysis – MRSA Prevalence



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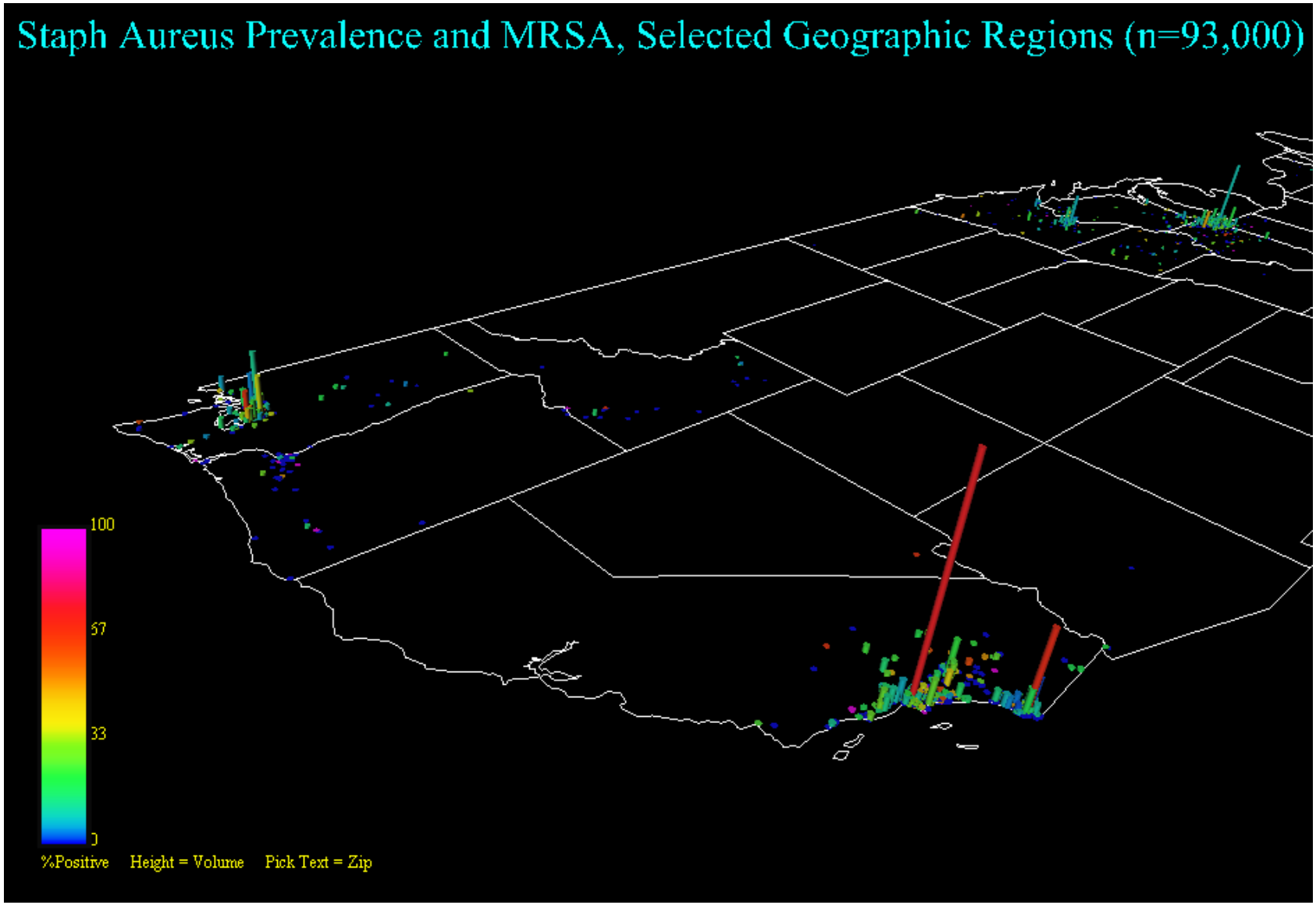
Data Analysis – MRSA Prevalence



Conclusion

- Quest Diagnostics has the ability to support bio-terrorism detection and emerging infectious disease detection, as well as broader public health surveillance needs, based on current core competencies
- AT&T has distinguishing capabilities including infrastructure, security, technology, AT&T Labs - Research capabilities and government program integration excellence
- The AT&T – Quest Diagnostics Team can provide the only nationally scaleable public health surveillance infrastructure to support the goals of our customers.

AT&T/Quest Diagnostics Team

- **AT&T Government Solutions**
  - Maureen Kitchelt* (443-956-9626)
  - Greg Kinne*
- **AT&T Labs**
  - Colin Goodall, Ph.D.*
  - Guy Jacobson, Ph.D.
  - Sam Parker, Ph.D.
  - Simon Tse, Ph.D.
  - Sylvia Halasz, Ph.D.
  - Arnold Lent, Ph.D.
  - Phil Brown
- **MedPlus, A Quest Diagnostics company**
  - Bernard L. Kasten, M.D.
  - John Odden* (949-842-2468)
- **Quest Diagnostics**
  - Biho Chung
  - Jake Geller, Ph.D.*
  - Peter N. R. Heseltine, M.D., FACP
  - Eileen Koski, M.Phil.* (201-729-7809)
    email: Eileen.X.Koski@questdiagnostics.com
  - Xiaohua Huang, M.S.
  - William A. Meyer III, Ph.D.
  - Matthew Scott

* Present at this PHIN conference

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